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ANNULAR AND PARTIAL SOLAR ECLIPSES IN 1955, 1956, 1957

NON-CENTRAL TOTAL ECLIPSE OF 1957

At the request of Commission 13 of the International Astronomical Union, the tracks of total solar eclipses have already been published until 1960 in U. S. Naval Observatory Circulars Nos. 1, 2 and 16 from data specially calculated in the office of the American Ephemeris from tabular positions of the Sun and Moon computed for the purpose in the British Nautical Almanac Office. The aim was to provide the location of tracks of total solar eclipses far enough in advance so that in regions where extended meteorological observations are lacking, suitable sites for eclipse expeditions can be determined. It is intended to issue this information at least eight years in advance.

The office of the American Ephemeris has now completed also the definitive calculations for the annular, partial and non-central total solar eclipses of 1955, 1956 and 1957, and the purpose of this circular is to give advance notice of the results.

The following corrections have been applied to the tabular positions of the Sun and Moon:

for 1955 and 1956: $+1''.00$ to the Sun's mean longitude, $-2''.00$ to the Moon's mean longitude, $-0''.50$ to the Moon's latitude.
for 1957: $+1''.40$ to the Sun's mean longitude, $-3''.00$ to the Moon's mean longitude, $-0''.50$ to the Moon's latitude.

The effect of a subsequent additional correction to the Moon's mean longitude on the position of the eclipse track may be closely determined as follows: for an additional positive correction of k seconds of arc, lay off from any point on the track a distance of $27 k$ seconds of arc in longitude, eastward along the same parallel of latitude.

ANNULAR ECLIPSE OF 1955 DECEMBER 14

Universal Time	Northern Limit		Central Line		Southern Limit		Duration of Annular Phase on Central Line
	Latitude	Longitude from Greenwich	Latitude	Longitude from Greenwich	Latitude	Longitude from Greenwich	
	° /	° /	° /	° /	° /	° /	m s
Limits	+22 57	-20 14	+21 18	-19 40	+19 42	-19 05	
5 ^h 15 ^m			18 29.4	25 58.7	15 55.9	27 33.8	7 40.4
20	16 25.4	34 17.6	14 22.5	34 46.6	12 27.4	35 02.8	8 15.0
25	13 57.6	39 23.5	12 06.2	39 32.0	10 19.7	39 33.7	8 38.9
30	+12 11.1	-43 04.3	+10 25.2	-43 04.7	+ 8 43.0	-43 00.4	8 59.5
35	10 46.7	46 02.4	9 04.0	45 58.7	7 24.4	45 51.4	9 18.3
40	9 36.8	48 34.1	7 56.2	48 28.1	6 18.3	48 19.2	9 36.0
45	8 37.5	50 47.2	6 58.3	50 40.1	5 21.7	50 30.6	9 52.7
50	7 46.4	52 47.1	6 08.4	52 39.4	4 32.6	52 29.7	10 08.5
55	7 02.2	54 36.5	5 25.0	54 28.8	3 49.9	54 19.3	10 23.5
6 00	+ 6 23.8	-56 17.7	+ 4 47.2	-56 10.3	+ 3 12.5	-56 01.3	10 37.7
05	5 50.4	57 52.4	4 14.2	57 45.5	2 39.9	57 37.2	10 51.2
10	5 21.5	59 21.7	3 45.6	59 15.5	2 11.6	59 08.0	11 03.8
15	4 56.7	60 46.5	3 21.0	60 41.2	1 47.2	60 34.7	11 15.5
20	4 35.6	62 07.6	3 00.1	62 03.2	1 26.4	61 57.9	11 26.2
25	4 17.9	63 25.7	2 42.6	63 22.3	1 09.0	63 18.2	11 35.8
30	+ 4 03.4	-64 41.2	+ 2 28.2	-64 39.0	+ 0 54.7	-64 36.1	11 44.4
35	3 52.0	65 54.6	2 16.9	65 53.6	0 43.5	65 52.0	11 51.8
40	3 43.6	67 06.2	2 08.6	67 06.5	0 35.3	67 06.3	11 57.9
45	3 38.0	68 16.5	2 03.1	68 18.1	0 29.9	68 19.3	12 02.8
50	3 35.1	69 25.8	2 00.3	69 28.6	0 27.2	69 31.3	12 06.3
55	3 34.9	70 34.3	2 00.3	70 38.5	0 27.2	70 42.5	12 08.5
7 00	+ 3 37.4	-71 42.4	2 02.9	-71 47.9	+ 0 30.0	-71 53.3	12 09.3
05	3 42.6	72 50.3	2 08.2	72 57.1	0 35.5	73 04.0	12 08.7
10	3 50.4	73 58.3	2 16.2	74 06.4	0 43.6	74 14.7	12 06.8
15	4 00.8	75 06.7	2 26.8	75 16.1	0 54.4	75 25.7	12 03.5
20	4 14.0	76 15.8	2 40.2	76 26.4	1 07.9	76 37.3	11 58.9
25	4 30.0	77 25.9	2 56.3	77 37.6	1 24.2	77 49.8	11 53.2
30	+ 4 48.9	-78 37.3	+ 3 15.3	-78 50.1	+ 1 43.4	-79 03.6	11 46.2
35	5 10.8	79 50.3	3 37.3	80 04.2	2 05.5	80 18.9	11 38.1
40	5 35.8	81 05.5	4 02.4	81 20.4	2 30.7	81 36.1	11 28.9
45	6 04.1	82 23.3	4 30.7	82 39.0	2 59.1	82 55.6	11 18.8
50	6 36.0	83 44.1	5 02.5	84 00.6	3 31.0	84 18.1	11 07.7
55	+ 7 11.7	-85 08.7	+ 5 38.1	-85 25.9	+ 4 06.5	-85 44.1	10 55.8

ANNULAR ECLIPSE OF 1955 DECEMBER 14 (Continued)

^h	^m	°	'	°	'	°	'	°	'	°	'	m	s
8	00	+	7 51.7	-86 38.0	+	6 17.8	-86 55.5	+	4 46.0	-87 14.4		10 43.1	
	05		8 36.4	88 12.9		7 02.1	88 30.6		5 29.9	88 49.9		10 29.7	
	10		9 26.4	89 54.6		7 51.5	90 12.3		6 18.8	90 31.7		10 15.5	
	15		10 22.6	91 45.1		8 46.8	92 02.3		7 13.4	92 21.6		10 00.6	
	20		11 26.1	93 46.6		9 49.0	94 02.9		8 14.6	94 21.7		9 45.0	
	25		12 38.6	96 02.8		10 59.9	96 17.5		9 24.0	96 35.0		9 28.7	
	30	+	14 03.0	-98 39.4	+	12 21.7	-98 51.1	+	10 43.6	-99 06.5		9 11.3	
	35		15 43.9	101 46.8 ³		13 58.6	101 52.6		12 17.3	102 04.0		8 52.7	
	40		17 51.0	105 44.1		15 58.7	105 39.8		14 12.1	105 43.2		8 32.1	
	45		20 53.1	111 35.3		18 44.0	111 00.6		16 45.4	110 43.2		8 07.5	
	50	..	...	...	..	...	...		21 46.0	121 11.9	..	...	
Limits		+	26 47	-123 58	+	25 10	-124 36	+	23 33	-125 14	...	...	

In the eclipse of 1955 December 14, geocentric conjunction occurs at $14^{\text{d}}07^{\text{h}}03^{\text{m}}42^{\text{s}}.1$ in right ascension $17^{\text{h}}23^{\text{m}}02^{\text{s}}.11$, the declination of the Sun being $-23^{\circ}10'20''.4$. West longitudes are positive.

PARTIAL ECLIPSE OF 1956 DECEMBER 2

In the eclipse of 1956 December 2, geocentric conjunction occurs at $2^{\text{d}}07^{\text{h}}54^{\text{m}}01^{\text{s}}.4$ in right ascension $16^{\text{h}}33^{\text{m}}59^{\text{s}}.67$, the declination of the Sun being $-21^{\circ}58'19''.9$. The greatest eclipse will have the magnitude 0.805, at longitude $-64^{\circ}32'$, latitude $+67^{\circ}52'$. West longitudes are positive.

The eclipse will be observable generally in continental Europe east of longitude 0° except most of Scandinavia; the Mediterranean coast of Africa east of longitude 0° ; the Red Sea, Asia Minor, Arabia, the Persian Gulf; and continental Asia south of latitude 68°N and west of longitude 115°E , with the exception of southern India, Indo-China and the south of China.

The coronal eclipse will be observable along a path starting in the Sahara Desert at about longitude 5°E , latitude 30°N , and moving southeasterly to Djibouti, then eastward across the Indian Ocean south of latitude 10°N , across southern India and northern Indo-China, and ending in southern China north of Hai-Nan.

ANNULAR ECLIPSE OF 1957 APRIL 29-30

This eclipse will not be central, the closest approach of the axis of shadow to the surface of the earth being approximately 8 miles, in longitude $-40^{\circ}04'$ and in latitude $+70^{\circ}40'$ where the greatest eclipse will occur.

The eclipse will be annular in the region bounded by the Southern Limit of umbra and a section of the curve "Middle of Eclipse at Sunrise".

ANNULAR ECLIPSE OF 1957 APRIL 29-30 (Continued)

U. T.	Southern Limit of Umbra		Middle of Eclipse at Sunrise	
	Latitude	Longitude from Greenwich	Latitude	Longitude from Greenwich
Limit 23 ^h 51 ^m 1	+65°34'	-56°30'	+65°34'	-56°30'
23 55	+69 47.5	-62 36.4	+67 06.3	-52 25.4
0 00	+72 48.0	-61 42.9	+68 58.4	-46 34.9
0 05	+75 10.3	-56 55.0	+70 41.6	-39 56.1
0 10	+76 51.5	-47 32.3	+72 13.6	-32 20.3
0 15	+77 12.2	-32 27.3	+73 31.3	-23 40.5
Limit 0 18.3	+74 13	-17 17	+74 13	-17 17

In the eclipse of 1957 April 29-30, geocentric conjunction occurs at 30^d00^h30^m39^s.7 in right ascension 2^h28^m01^s.51, the declination of the sun being +14°37'41".8. West longitudes are positive.

TOTAL ECLIPSE OF 1957 OCTOBER 23

Oppolzer's *Canon der Finsternisse* lists this eclipse as partial and therefore it was omitted from the preliminary data published in U. S. Naval Observatory Circular No. 2. The definitive computation has revealed however that the cone of umbra will touch the earth for a short time. The eclipse will not be central, the closest approach of the axis of shadow to the surface of the earth being approximately 21 miles, in longitude +23°20' and in latitude -71°15' where the greatest eclipse will occur.

The eclipse will be total in the region bounded by the Northern Limit of umbra and a section of the curve "Middle of Eclipse at Sunrise".

U. T.	Northern Limit of Umbra		Middle of Eclipse at Sunrise	
	Latitude	Longitude from Greenwich	Latitude	Longitude from Greenwich
Limit 4 ^h 49.5	-69°31'	+18°37'	-69°31'	+18°37'
4 50	-70 27.9	+15 51.8	-69 44.1	+19 09.9
4 55	-73 10.7	+19 43.8	-71 55.2	+25 23.6
Limit 4 57.0	-72 45	+28 13	-72 45	+28 13

In the eclipse of 1957 October 23, geocentric conjunction occurs at 23^d5^h21^m52^s.8 in right ascension 13^h49^m53^s.32, the declination of the sun being -11°18'44".1. West longitudes are positive.

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